The Fuel Characteristic Classification System (FCCS 2.0)

Introduction

Fuelbeds vary widely in their physical attributes, potential fire behavior, and fire effects. As models that predict fire behavior, fire effects, and carbon cycling become more sophisticated and widely used, there is an increasing need to accurately quantify and classify the structural and geographical diversity of wildland fuels. The Fuel Characteristic Classification System (FCCS) was designed to accurately represent the diversity of fuels found throughout North America and predict their relative fire hazard. The soon-to-be-released FCCS version 2.0 will build on this system by predicting surface fire behavior and quantifying carbon stores for each calculated fuelbed.

About FCCS

FCCS is a user-friendly software program that allows users to access fuelbeds from a nation-wide library or create their own custom fuelbeds. FCCS fuelbeds were compiled from published literature, fuels photo series, fuels data sets and expert opinion. Users can modify the FCCS fuelbeds to create a set of customized fuelbeds representing any scale of interest.

Figure 1: Fuel strata and categories in the FCCS.

When a user has completed editing fuelbed data, FCCS reports input and calculated fuel characteristics for each existing fuelbed component, from canopy fuels to ground fuels (Figure 1). FCCS also calculates the relative fire hazard of each fuelbed, including surface fire behavior, crown fire, and available fuel potentials, scaled on an index from 0 to 9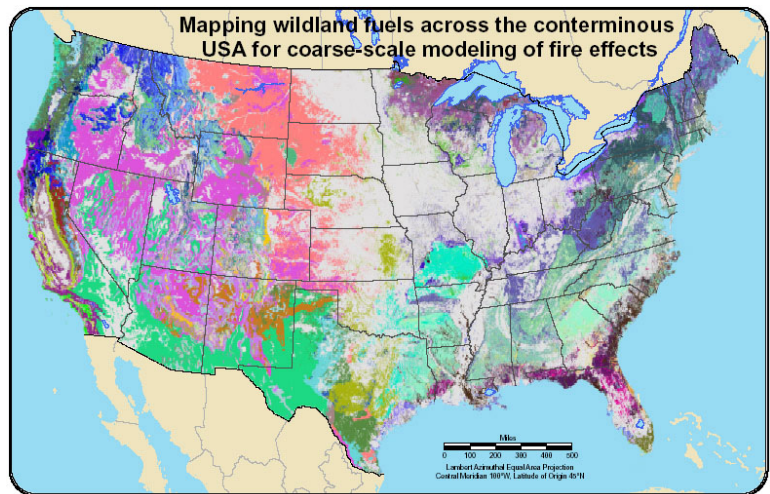. These FCCS fire potentials will facilitate communication of fire hazard among users and provide an index of the intrinsic capacity of each fuelbed for surface fire behavior, crown fire and available consumption of fuels under dry benchmark environmental conditions (no slope, 4 mph midflame wind speeds, and dry fuel moistures).

FCCS version 2.0 will predict surface fire behavior, including reaction intensity (BTU ft^{-2} min^{-1}), flame length (ft), and rate of spread (ft min^{-1}) based benchmark and user-specified environmental conditions. By comparing predicted flame length and rate of spread, FCCS 2.0 will provide a crosswalk to one of the original 13 Fire Behavior Prediction System fuel models and one of the 40 standard fuel models (Scott and Bergan 2005). FCCS 2.0 also will report carbon storage by fuelbed category and subcategory and predict the amount of combustible carbon in each category and subcategory based on selected fuel moisture scenarios. Additional changes in version 2.0 will include: reports in English and metric

units, photo uploads to represent each fuelbed, and a batch mode to provide output on a set of multiple fuelbeds.

Applications

FCCS facilitates the mapping of fuelbed characteristics and fire hazard assessment (Figure 2; http://www.fs.fed.us/pnw/fera/fccs/), by providing fuelbeds, fuelbed characteristics, and associated predicted surface fire behavior, crown fire, and available fuel potentials. FCCS also provides the necessary inputs to run fuel consumption and emission production models, such as Consume 3.0 and the Fire Emissions Production Simulator (FEPS).

Mapping wildland fuels across the conterminous USA for coarse-scale modeling of fire effects

The system is currently being showcased as a tool to map fuelbeds and fire hazard, which allows managers to maximize fuel treatment effectiveness on the Okanogan and Wenatchee National Forests, and on the Deschutes National Forest. FERA has also demonstrated the use of FCCS as the basis for a national air pollutant and carbon emission inventory, in cooperation with the U.S. Environmental Protection Agency. LANDFIRE is currently developing a map layer of the FCCS fuelbeds throughout the United States.

FCCS v 2.0 is expected to be released in October 2008. FCCS v. 1.1 software, tutorial, and user's guide are available for download from the FERA website (http://www.fs.fed.us/pnw/fera/fccs/). The FCCS has been transferred to managers and scientists during 15 national workshops and through eight published papers in a special section of the Canadian Journal of Forest Research (CJFR). In future versions, we expect References will be available, new fuelbeds, linkages with other FERA tools, FireMON, links to FOFEM, Fuelbed building tool

For More Information Contact:

Roger Ottmar
Fire and Environmental Research Applications Team
USDA Forest Service Pacific Wildland Fire Sciences Lab
400 North 34th Street, Suite 201
Seattle, Washington 98103
Office phone: (206) 732-7826
Cell phone: (206) 849-3172
E-mail: rottmar@fs.fed.us

Visit the FCCS Website at:

http://www.fs.fed.us/pnw/fera/fccs/

Last Updated: September 5, 2008